REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejections of the application are respectfully requested in view of the amendments and remarks herewith, which place the application into condition for allowance. The present amendment is being made to facilitate prosecution of the application.

I. STATUS OF THE CLAIMS AND FORMAL MATTERS

Claims 1-23 are pending. Claims 1, 12, 17 and 18, which are independent, are hereby amended. Changes to claims are not made for the purpose of patentability within the meaning of 35 U.S.C. §101, §102, §103, or §112. Rather, these changes are made simply for clarification and to round out the scope of protection to which Applicants are entitled.

Applicants note that the Office Action did not include an indication of the patentability of claims 20-23, which were presented in a Preliminary Amendment filed February 19, 2002. This Preliminary amendment also amended claims 5-11, 14-16 and 19. Thus, Applicants submit that the objections to claims 8 and 19 are rendered moot by the Preliminary Amendment.

Applicants acknowledge that the Office Action has indicated that claims 2-11 and 13 have been indicated as allowable.

II. REJECTIONS UNDER 35 U.S.C. §102(e)

Claims 1, 12 and 14-19 were rejected under 35 U.S.C. §102(e) as allegedly anticipated by U.S. Patent No. 6,6,760,377 to Burns et al.

Claim 1 recites, *inter alia*:

"...wherein the encoder controls (i) the target bit rate of the second bitstream and (ii) the recoding of the second bitstream to meet the said target bit rate,

the target bit rate being varied in dependence on one or both of (a) V_2 and (b) the difference between V_1 and V_2, and

the degree of reuse of the said preserved parameters being varied in dependence on one or both of (a) the degree to which V_2 tends towards underflow and (b) the degree to which V_1 differs from V_2 tending towards underflow." (emphasis added)

U.S. Patent No. 6,760,377 to Burns et al. (hereinafter, merely "Burns") relates to decoding MPEG-2 bitstreams. Applicants note that column 7, lines 1-20 of Burns discloses an encoder that achieves so-called "VBV-lock" when splicing a bitstream B_o to a bitstream A_o. VBV stands for "video buffer verifier" and is a measure of the number of bits that would be in a downstream buffer (see, Burns column 6, lines 32-33). VBV occupancy is measured at an encoder to ensure that the buffer of a downstream decoder neither overflows nor under flows. When splicing bitstreams A_o and B_o together, these two bitstreams are likely to have differing VBV occupancies at the splice-point. If this fact is not taken into account when performing the splicing, then it is more than likely that the buffer of a downstream decoder receiving the spliced bitstream C will either overflow or underflow. Hence, Burns discloses, in Column 7, lines 1-20, how an encoder produces the spliced bitstream C by continually changing the VBV occupancy of the spliced bitstream C from the value for bitstream A_o just before the splice-point to the value for bitstream B_o. The point at which the VBV occupancy of spliced bitstream C becomes identical to that of bitstream B_o is known as the VBV-lock point.

Furthermore, Applicants note that column 8, lines 25-44 of Burns simply discloses how reference Q (quantisation) scales for macroblocks may be estimated so that, when re-encoding the bitstream B_o, the resulting Q scales are similar to those used in bitstream B_o in

the previous generation. This helps improve the quality when re-encoding. Applicants respectfully submit that this is **not** reuse of preserved parameters.

In column 8, lines 45-65 of Burns, it is disclosed how an encoder undertakes encoding between a splice-point and VBV-lock point, so that the occupancy of a downstream buffer follows a continuous but changing trajectory from before the splice-point at bitstream A_o occupancy to VBV-lock at the bitstream B_o occupancy. If the occupancy of the downstream buffer needs to be increased, then the encoder uses a smaller number bits to encode a picture (so that fewer bits are removed from the downstream buffer when the downstream decoder is decoding the picture). Conversely, if the occupancy of the downstream buffer needs to be decreased, then the encoder uses a larger number of bits to encode a picture.

Applicants submit that Burns does disclose re-encoding a bitstream with reuse of preserved parameters in column 4, line 42 to column, 5 line 7 (with reference to Figure 1). Indeed, this shows how MPEG-2 parameters may be derived by a decoder and reused in encoding the bitstreams A_o and B_o. However, around the splice-point between bitstreams A_o and B_o, these bitstreams are fully re-encoded, i.e. without reuse of the parameters.

Therefore, Burns only actually discloses re-using parameters for re-encoding when a frame to be re-encoded is in a region other than a transition region around a splice-point. Burns, therefore, only discloses determining whether or not to reuse parameters in dependence upon whether or not the frame to be re-encoded is in a transition region around a splice-point.

Thus, Burns neither discloses nor suggests (in either the passages cited by the Office Action or in the remainder of document) reusing preserved parameters when re-encoding a bitstream, the degree of reuse of the preserved parameters being varied, as recited in claim 1. Moreover, the way in which the degree of reuse of the preserved parameters is varied, as claimed

in claim 1, (namely in dependence on one or both of (a) the degree to which V_2 tends towards underflow and (b) the degree to which V_1 differs from V_2 tending towards underflow) is neither disclosed nor suggested by Burns.

The Office Action also asserts that "the target bit rate being varied in dependence on one or both of (a) V_2 and (b) the difference between V_I and V_2"- is disclosed in Burns in column 7, lines 1-20 and/or column 8, lines 25-65. Applicants respectfully disagree with that assertion for the following reasons.

The passages of Burns cited by the Office Action have been described above. Neither of these passages (and indeed no section of Burns as a whole) discloses or suggests calculating a difference between a first buffer occupancy (V_1) by a first bitstream and a second buffer occupancy (V_2) of a downstream decoder buffer by a second bitstream. Furthermore, Burns neither discloses nor suggests using this calculated difference in order to vary a target bit rate.

In contrast, the current claimed invention recognizes that it is beneficial to reuse preserved parameters as much as possible, so that, when re-encoding a bitstream, image quality is preserved as much as possible (see Specification, page 12, lines 19-20). However, it has been found that, when re-encoding a bitstream with reuse of preserved parameters, the VBV occupancy after re-encoding (VBV_2 or V_2) may still differ from the VBV occupancy before re-encoding (VBV_1 or V_1) (page 9, lines 9-14). Indeed, V_2 tends to drift away from V_1. This drift of V_2 away from V_1 may lead to the downstream buffer underflowing (if V_2 is lower than V_1 as V_1 itself tends towards underflow).

Therefore, according to the invention of the current application, the degree of reuse of the preserved parameters is reduced (i) as the size of the drift increases (i.e., as V_2

decreases more and more away from V_1) and (ii) as the likelihood of underflow increases (i.e. as V_2 decreases or tends to underflow) (see Specification, page 11, lines 19-20). Additionally, the target number of bits for a GOP (group of pictures), which equates to a target bit rate, is also varied in dependence on these two factors (Specification, page 11, line 27 to page 12, line 12: this shows how three thresholds are used to determine (a) for which frames preserved parameters are reused and (b) the size of the variation in the target number of bits for a GOP).

Therefore, Applicants submit that independent claim 1 is patentable.

Independent claim 17 is similar in scope and believed patentable for similar reasons.

Claim 12 recites, *inter alia*:

"...wherein the encoder controls (i) the target bit rate of the second bitstream and (ii) the recoding of the second bitstream to meet the said target bit rate, and

if V_2 is tending towards overflow of the downstream buffer and/or V_2 differs from V_1 tending towards overflow of the downstream buffer, the encoder adds stuffing bits to the bitstream and recodes the second bitstream reusing the said preserved parameters." (emphasis added)

Section three of the Office Action suggests that "if V_2 is tending towards overflow of the downstream buffer and/or V_2 differs from V_1 tending towards overflow of the downstream buffer, the encoder adds stuffing bits to the bitstream and recodes the second bitstream reusing the preserved parameters" is disclosed in Burns in column 7, lines 59-61. Applicants respectfully disagree with the Office Action for the following reasons.

While this cited section of Burns does disclose using stuffing bits, the use and purpose of these stuffing bits is entirely different to the claimed invention. According to Burns, the total number of bits to be used to encode (the remainder of) a GOP is "Remain_bit_GOP" (see Burns, column 6, lines 36-39). At the beginning of a transitional GOP following a splice-

point, Remain_bit_GOP is calculated in the normal (MPEG-2 style) manner (see Burns, column 7, lines 41-43). The Remain_bit_GOP is then adjusted by a value "Extra_bits", which represents the amount (greater or fewer) of bits required for the transitional GOP in order to achieve VBV_lock at the end of encoding the transitional GOP (see Burns, column 7, lines 44-55). Finally, Remain_bit_GOP is scaled down by a factor α, which is one or less. This is done so that "spare bits allow additional bits ('stuffing' bits) to be added to achieve exact lock" (see Burns, column 7 lines 60-61). This is also described in more detail in column 10 lines 15-43, which shows, in particular, that "Remain bit GOP is reduced by the factor α, and rate control ovetsteers so that spare bits are available at the end of the GOP. The spare bits are used to achieve exact lock". Hence, Burns makes use of spare bits to attain VBV-lock.

In contrast, the claimed invention recognizes that it is beneficial to reuse preserved parameters as much as possible, so that, when re-encoding a bitstream, image quality is preserved as much as possible (see Specification, page 12 lines 19-20). However, it has been found that, when re-encoding a bitstream with reuse of preserved parameters, the VBV occupancy attar re-encoding (VBV 2 or V 2) may still differ from the VBV occupancy before re-encoding (VBV_1 or V _I) (see Specification, page 9 lines 9-14). Indeed, V_2 tends to drift away from V 1. This drift of V_2 away from V_1 could lead to the downstream buffer overflowing (if V-2 is greater than V I as V I tends towards overflow).

Therefore, according to the claimed invention, to reduce the drift (difference between V_1 and V_2) and reduce the likelihood of overflow, the encoder uses stuffing bits to increase the amount of bits used for the GOP (see Specification, page 10, line 20 to page 11, line 8). As stated in page 10 line 29, adding bits at the encoder to increase its occupancy results in

decrease of the occupancy of the downstream butler, i.e. V_2 is reduced so that (i) overflow is avoided and (ii) V_2 is brought closer to V_1.

The calculation of this drift between V_1 and V_2 is neither suggested nor disclosed by Burns, nor is its use to help prevent overflow of a downstream buffer by controlling when to apply stuffing bits.

Therefore Applicants respectfully submit that claim 12 is patentable.

For reasons similar to or somewhat similar to those described above with regard to independent claim 12, independent claim 18 is also believed to be patentable.

III. DEPENDENT CLAIMS

The other claims are dependent from one of the independent claims, discussed above, and are therefore believed patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

CONCLUSION

In the event the Examiner disagrees with any of statements appearing above with respect to the disclosure in the cited reference, it is respectfully requested that the Examiner specifically indicate those portions of the reference, providing the basis for a contrary view.

Please charge any additional fees that may be needed, and credit any overpayment, to our Deposit Account No. 50-0320.

In view of the foregoing amendments and remarks, it is believed that all of the claims in this application are patentable and Applicants respectfully request early passage to issue of the present application.

Respectfully submitted,

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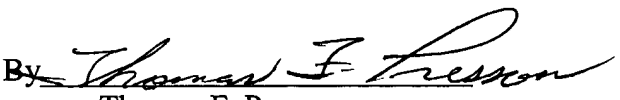
By 
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